

PROFESSIONAL REGISTRATIONS

Professional Engineer, CA
No. C29432, 1978

Professional Engineer, Institute of Civil
Engineers, Lebanon, 1970

EDUCATION

PhD, Geotechnical Engineering,
University of California, Berkeley, CA,
1976

MS, Geotechnical Engineering, University
of California, Berkeley, CA, 1971

BS, Civil Engineering, American
University of Beirut, Lebanon, 1970

EXPERIENCE

Professional Start Date: 08/1976

SAGE Start Date: 03/2015

PROFESSIONAL AFFILIATIONS

Academy of Geo-Professionals,
Diplomate, Geotechnical Engineering

American Society of Civil Engineers

Association of California Water Agencies

Association of State Dam Safety Officials

Earthquake Engineering Research
Institute

Institute of Civil Engineers (UK)

International Society for Soil Mechanics
and Foundation Engineering

Seismological Society of America

U.S. Society of Dams (Committee on
Earthquakes)

PROFESSIONAL SUMMARY

Dr. Makdisi's career has combined applied research and professional practice in geotechnical and foundation/earthquake engineering for commercial, industrial, and critical structures. For the past 20 years, he has focused on geotechnical studies and safety evaluations of earth and rockfill dams, embankments, and levees. His work includes feasibility evaluations and preliminary design studies; field investigation design and planning; borrow area material studies; in situ and laboratory testing; and evaluation and interpretation of static and dynamic material properties of dams and their foundations. Studies also included stability evaluations of embankment slopes, seepage analyses, and static and dynamic stress analyses to evaluate stability during earthquakes.

Dr. Makdisi has performed studies to determine earthquake-induced permanent deformations in slopes and embankments and has developed and published (with the late Harry .B. Seed) widely-used simplified procedures for estimating the dynamic response and permanent deformations in earth and rockfill dams and embankments. He was a lead participant in earthquake ground motion studies and development of seismic design criteria for key facilities such as dams and nuclear power plants. He was Principal Investigator for the "Stability of Slopes, Embankments and Rockfalls" chapter of the Seismic Retrofit Manual for the Federal Highway Project, prepared for the National Center for Earthquake Engineering Research.

Dr. Makdisi is currently serving as a member of the Director's Safety Review Board for Perris Dam, Castaic and Crafton Hills Dams, B. F. Sisk Dam, and four Delta Dams, for the California Department of Water Resources (DWR), Division of Safety of Dams. He also currently serves as a member of the Board of Consultants for Conconully Dam, for the US Bureau of Reclamation. He was a member of the team of Technical Advisors to the Los Angeles District, U.S. Army Corps of Engineers that provided review on the design and construction of the 600-foot-high Seven Oaks Dam in Southern California. He has served as peer reviewer of the seismic analyses of and safety studies for Terminus, Success, and Lake Isabella dams for the U.S. Army Corps of Engineers, Sacramento District. He also served as a member of the Board of Consultants for the review of seismic remediation of John Hart Dam, for B.C. Hydro, Canada, and on an Independent Expert Panel reviewing the seismic performance of Potrerillos Dam in Mendoza, Argentina. He provided independent expert technical review of the White River seismic remediation project in Seattle, Washington, for the Federal Energy Regulatory Commission (FERC).

Dr. Makdisi currently serves as a member of a senior technical review board providing peer review of the design and construction of setback levees and levee upgrades on the Bear River, Feather River, and South Yuba River, north of Sacramento, California. He has also provided expert technical support to the State of California Attorney General's Office during litigation related to the levee failure on the Feather River near Marysville, California, during the flood of 1997; and provided expert litigation support for a case related to seepage

problems of the Madera Canal downstream of Friant Dam.

He has provided technical oversight and construction quality assurance for San Luis Obispo County for the Lopez Dam seismic remediation project and provided independent technical review of the seismic stability of Calaveras Dam for the San Francisco Public Utilities Commission.

Dr. Makdisi has published more than 50 papers and major research reports. His paper (co-authored with H. Bolton Seed, Lee, and Idriss) on the analyses of the slides in the San Fernando Dams during the 1971 earthquake was awarded the 1977 Norman Medal award of the American Society of Civil Engineers.

As a member of a team of Technical Advisors to the Los Angeles District, Corps of Engineers, on the design and construction of Seven Oaks Dam in California, Dr. Makdisi was a co-recipient of the U.S. Army Corps of Engineers, Chief of Engineers "Design and Environmental Honor Award for 2002" for the design and construction of Seven Oaks Dam in California.

He has presented lectures at ASCE seminars and workshops in San Francisco, Los Angeles, and Oakland, California, and Seattle, Washington, as well as lectures at the University of California campuses at Berkeley and Davis, Stanford University, University of Washington, University of Illinois at Urbana-Champaign, University of Puerto Rico at Mayaguez, Virginia Technical University, and Jinhua University in Beijing, China. He was invited to present a keynote lecture on the seismic stability of embankments and slopes at the session on slope stability at the Geo-Denver 2000 conference of ASCE's Geo-Institute. He also presented a lecture on seismic design criteria for dams at the Federal Energy Regulatory Commission's (FERC) Dam Safety Workshop, held in Portland, Oregon, in March 2001.

During the past several years, Dr. Makdisi has been involved in studies for more than 50 dams; 25 of these projects were under the jurisdiction of the California Division of Safety of Dams or FERC.

Dr. Makdisi is a FERC-Approved Independent Consultant and has performed FERC Part12D safety inspections for over 80 dams, and has facilitated Potential Failure Modes Analysis (PFMA) workshops for over 25 dams. Recently, he has provided training for a PFMA workshop for Mudan Dam in Taiwan, for staff of the Southern Region Water Resources Agency and its dam safety consultants.

REPRESENTATIVE PROJECT EXPERIENCE

Crane Valley Dam

Confidential Utility Client, Madera County, CA

Principal-in-charge for geotechnical and geologic investigations, and evaluations of seismic stability of a 130-foot-high hydraulic fill dam, including design of remedial measures, and support services during construction.

Lake Isabella Dams

US Army Corps of Engineers, Sacramento District, Kern County, CA

Member of a Joint Venture Team providing support for safety evaluation studies for two dams on Lake Isabella that included field investigations, geologic fault studies, seepage analyses, liquefaction assessments, seismic deformation and stability analyses of the embankments and outlet structures, potential failure modes analyses (PFMA), evaluation of alternatives for remediation of seismic, hydraulic and seepage deficiencies, and expert elicitation support for baselines risk assessment.

Anderson and Guadalupe Dams

Santa Clara Valley Water District, Santa Clara County, CA

Principal-in-charge of geologic and geotechnical studies of the potential for fault rupture, ground motions estimates, and seismic stability of two embankment dams, including evaluation of the conceptual design of remedial measures.

Seven Oaks Dam

U.S. Army Corps of Engineers, Los Angeles District, San Bernardino, CA

Principal-in-charge for evaluation of seismic stability of a 600-foot-high earth and rockfill dam, and served on a Technical Advisory Board during design and construction.

San Pablo Dam

East Bay Municipal Utility District, San Pablo, CA

Principal-in-charge responsible for estimates of earthquake ground motions, field investigations and laboratory testing, evaluation of seismic stability, and conceptual design of alternative remedial measures.

Lake Almanor and Butt Valley Dams

Confidential Utility Client, Plumas County, CA

Project manager responsible for evaluation of seismic stability, design of remedial measures, and support services during construction.

Thompson Creek and Eaton Wash Dams

Los Angeles County Department of Public Works, Los Angeles, CA

Principal-in-charge for evaluation of seismic stability, design of remedial measures, and support services during construction.

Painted Rock Dam

U.S. Army Corps of Engineers, Los Angeles District, AZ

Project manager responsible for the evaluation of the potential for seepage and finite-element analysis of the potential for hydraulic fracturing.

Hansen, Whittier Narrows, and Prado Dams

U.S. Army Corps of Engineers, Los Angeles District, Los Angeles, CA

Project manager responsible for performing deterministic and probabilistic estimates of earthquake ground motions and evaluation of seismic stability.

Leland and Piedmont Reservoir Embankments

East Bay Municipal Utility District, Lafayette, CA

Principal-in-charge; performed estimates of earthquake design ground motions and evaluation of seismic stability.

Rollins and Dutch Flat Afterbay Dams

Nevada Irrigation District, Yuba-Bear River, CA

Project manager responsible for evaluation of the potential for liquefaction and earthquake-induced deformation.

Lopez Dam

San Luis Obispo County Department of Public Works, Arroyo Grande, CA

Principal-in-charge of technical review and oversight for evaluation of the potential for foundation liquefaction and design of remedial measures, including stone column densification.

Halsey Forebay, Blue Lake, Pit No. 4, and Mc Cloud Dams

Confidential Utility Client, Auburn, CA

Project manager responsible for evaluation of seismic stability and review of alternatives for remedial measures.

New Exchequer Dam

HDR Engineering, Inc., Merced River, CA

Project manager responsible for assessment of seismicity, design ground motions, and evaluation of seismic stability and earthquake-induced deformations for the Merced Irrigation District.

Don Pedro Dam

HDR Engineering, Inc., Tuolumne River, CA

Project manager; performed estimates of earthquake ground motions and review of seismic stability for the Turlock Irrigation District.

Wishon and Lake Fordyce Dams

Confidential Utility Client, King River, CA

Project manager responsible for the evaluation of seepage concerns, stability of spillway gravity wall, and evaluations of seismic stability and deformation of embankment slopes.

Blue Ridge Dam

Tennessee Valley Authority, Blue Ridge, GA

Principal-in-charge responsible for evaluation of earthquake ground motions, assessment of liquefaction potential and seismic stability, and evaluation and conceptual design of alternative remedial measures.

Calaveras Dam

City and County of San Francisco, San Francisco, CA

Principal-in-charge; performed an evaluation of potential for liquefaction and earthquake-induced deformations.

Success Dam

U.S. Army Corps of Engineers, Sacramento County, CA

Principal-in-charge; performed seismic deformation analyses to support design of remediation.

FERC Part 12 Independent Consultant for: Lyons, Relief, and Main Strawberry dams; Drum forebay, Drum afterbay, Halsey forebay, Halsey afterbay, Rock Creek, and Wise forebay dams; Wishon, Courtright, and Philbrook dams; Pit 1 Forebay, Pit 3, Pit 4, Pit 5 Open Conduit, Pit 6, and Pit 7 dams; New Exchequer Dam; New Bullards Bar, Log Cabin, and Our Hour House dams; North Battle Creek, Macumber, and Manzanita dams; Blue Lake, Lake Fordyce, Kidd Lake, Fuller Lake, Rucker Lake, Lake Valley, Meadow Lake, Lake Spaulding, and Upper Peak Lake dams; Santa Felicia Dam; Lost Creek, Sly Creek, Miners Ranch, Ponderosa, and Little Grass Valley dams; and Lake Almanor, Butt Valley, Belden forebay, Grizzly forebay, Bucks Storage and Bucks Diversion Dams; Chili Bar, Balch Diversion, Balch afterbay, and Kerckhoff dams; Upper Bear, Lower Bear, Upper Blue, Tiger Creek afterbay, and Lake Tabeaud dams; Tulloch, Beardsley, and Donnell's dams; Hell Hole, LL Anderson, and Ralston Afterbay Dams; Lundy, Rhinedollar, Saddlebag, Tioga Lake, Agnew Lake, Gem Lake, and Rush Meadow dams; , and New Spicer Meadows and McKays Point Diversion Dams.

FERC Potential Failure Modes Analysis Facilitator for: New Bullards Bar, Log Cabin and Our House Dams; Scott Dam; Lake Almanor, Butt Valley, and Belden Forebay dams; Don Pedro dam; Pit 1 dam, Pit 3, Pit 4, Pit 5 Open Conduit, Pit 6, and Pit 7 dams; Lake Tabeaud, Lower Bear, Upper Bear, Upper Blue Lake, and Tiger Creek Dams; Drum forebay, Drum afterbay, Halsey forebay, Halsey afterbay, Rock Creek, and Wise forebay dams; and San Antonio dam. In addition to facilitation of PFMA Review Sessions and workshops for over 30 dams.

Selected Publications and Presentations

"Seismic Hazard assessment for Qaraoun dam in the Bekaa Valley, Lebanon." C. B. Johnson, D. G. Murphy, and F. I. Makdisi. Tenth U.S. National Conference on Earthquake Engineering, Anchorage, Alaska, July, 2014

"Risk of Seismic Deformation of a 1960's Rockfill Dam in Lebanon." J. Phalen, F.I. Makdisi, J. Hu, E. Viala, and N. Amacha. Tenth U.S. National Conference on Earthquake Engineering, Anchorage, Alaska, July, 2014.

"Numerical Studies of I-Shaped Levee Flood Wall at St. Paul, Minnesota Site." J. Hu, Z. L. Wang, F. I. Makdisi, C. Y. Chang, K. Hokens, and N. Schwanz. Proceedings of the ASCE Geo-Congress, in Atlanta, GA, February, 2014.

"A Critical State-Based Plasticity Model Analysis of Lower San Fernando Dam Failure." F. Ma, Z.L. Wang, F. Makdisi, and J. L. La Vassar, Proceedings of the 3rd International FLAC/DEM Symposium on Numerical Modelling, 2013.

"Three dimensional Soil-Structure-Interaction Analysis of a Floodwall under Full-Scale Load Test." J. Hu, F.I. Makdisi, Z. L. Wang, K. Hokens and Neil Schwanz, 7th International Conference on Case Histories in Geotechnical Engineering, Chicago, May, 2013.

"Seismic Retrofit of Crane Valley Dam." D. Ritzman, F.I. Makdisi, J. de Larios, J. Sun, and C. Ahlgren, 7th International Conference on Case Histories in Geotechnical Engineering, Chicago, May, 2013.

"Evaluation of Seismic Stability and Design of Remediation of a 1920s Vintage Hydraulic Fill Dam." F.I. Makdisi, D. Ritzman, J. Phalen, J. Sun and C. Ahlgren, Dam Safety 2011, Association of State Dam Safety Officials, Washington, D.C., September 25-29, 2011.

"Evaluation of Stability of a Reservoir Embankment in a High Seismic Environment." F.I. Makdisi, Z.L. Wang, and A. Yiadom. The 14th World Conference on Earthquake Engineering, Beijing, China, October 12-17, 2008.

"Design Ground Motions Library (DGML) – Tools for selecting time history records for specific engineering applications." R. R. Youngs, M. S. Power, G. Wang, F.I. Makdisi, and C. Chin. Proceedings of the SMIP 07 Seminar on Utilization of Strong-Motion Data, California Geological Survey, Strong Motion Instrumentation Program, September 13, 2007.

"Practical Applications of a Nonlinear Approach to Analysis of Earthquake-Induced Liquefaction and Deformation of Earth Structures." Z.L. Wang, F.I. Makdisi, and J. Egan. Journal of Soil Dynamics & Earthquake Engineering, Volume 26, Issue 2-4, p231-252, 2006.

"Attenuation Relationships for Shallow Crustal Earthquakes Based on California Strong Motion Data." K. Sadigh, C.-Y. Chang, J.A. Egan, F. Makdisi, and R.R. Youngs. Seismological Research Letters: Eastern Section of the Seismological Society of America, v. 68, no. 1, January/February 1997.

"Performance of Earth Dams During Earthquakes." H.B. Seed and F.I. Makdisi. Journal of Water Power and Dam Construction, v. 32, no. 8, August 1980.

"Simplified Procedure for Evaluating Embankment Response." F.I. Makdisi and H.B. Seed. Journal of the Geotechnical Division, ASCE, v. 105, no. GT12, December 1979.

"A Simplified Procedure for Estimating Earthquake-Induced Deformations in Dams and Embankments." F.I. Makdisi and H.B. Seed. Journal of the Geotechnical Division, ASCE, v. 104, no. GT7, July 1978.

"Slides in the San Fernando Dams during the Earthquake of February 9, 1971." H.B. Seed, K.L. Lee, I.M. Idriss, and F.I. Makdisi. Journal of the Geotechnical Division, ASCE, v. 101, no. GT7, July 1975.